

# **Bedrock Aquifer Systems of LaPorte County, Indiana**

by  
Indiana Department of Natural Resources,  
Division of Water  
1990, 1994

The occurrence of bedrock aquifers depends on the original composition of the rocks and subsequent changes which influence the hydraulic properties. Post-depositional processes, which promote jointing, fracturing, and solution activity of exposed bedrock, generally increase the hydraulic conductivity (permeability) of the upper portion of bedrock aquifer systems. Because permeability in many places is greatest near the bedrock surface, bedrock units within the upper 100 feet are commonly the most productive aquifers.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and glacial till act as aquitards, restricting recharge to underlying bedrock aquifers. However, fracturing and/or jointing may occur in aquitards, which can increase recharge to the underlying aquifers. Hydraulic properties of the bedrock aquifers are highly variable. Most of the bedrock aquifers in the county are under confined conditions. In other words, the potentiometric surface (water level) in most wells completed in bedrock rises above the top of the water-bearing zone.

The susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. Because the bedrock aquifer systems have complex fracturing systems, once a contaminant has been introduced into a bedrock aquifer system, it will be difficult to track and remediate.

## **Devonian and Mississippian -- Coldwater, Ellsworth, and Antrim Shales Aquifer System**

One bedrock aquifer system is identified for LaPorte County: the Devonian and Mississippian age Coldwater, Ellsworth, and Antrim Shales. This system subcrops throughout LaPorte County. These shales are commonly considered an aquitard; therefore, the system is an extremely limited groundwater resource.

LaPorte County has a complex glacial history and was subjected to multiple glacial advances from the north and northeast resulting in glacial sediment deposits completely covering the county. The thickness of unconsolidated sediments ranges from over 400 feet in the northwest to approximately 50 feet in the southwest corner of LaPorte County. Major sand and gravel aquifers occur in these thick unconsolidated deposits overlying the bedrock.

This aquifer system consists of the Coldwater, Ellsworth, and Antrim Shales. However, in LaPorte County only the Ellsworth and Antrim Shales are present. The Ellsworth Shales consist primarily of gray-green shale with limestone or dolomite lenses in the upper part and alternating

beds of gray-green shale and black-brown shale in the lower part. The underlying Antrim Shales consist of brown to black non-calcareous shale in the upper part and black to brown non-calcareous shale with calcareous shale, limestone, and sandstone present in the lower part of the unit. This system is overlain by unconsolidated deposits ranging in thickness from 50 feet to over 400 feet.

Because of the availability of the overlying unconsolidated resources, few water wells have been completed in the Coldwater, Ellsworth, and Antrim Shales Aquifer System in LaPorte County. However, this aquifer system is capable of meeting the needs of some domestic users in this county. Domestic well yields are commonly less than 10 gallons per minute with dry holes likely. Well depths range from 66 to 200 feet deep and static water levels typically range from 10 to 80 feet below the land surface. The amount of rock penetrated in this system ranges from 50 to 62 feet. There are no registered significant groundwater withdrawal facilities in LaPorte County.

Since the permeability of shale materials is considered low and the overlying unconsolidated deposits are thick, susceptibility to contamination introduced at or near the surface is low.

### **Map Use and Disclaimer Statement**

We request the following agency be acknowledged in products derived from this map: Indiana Department of Natural Resources, Division of Water.

This map was compiled by staff of the Indiana Department of Natural Resources, Division of Water using data believed to be reasonably accurate. However, a degree of error is inherent in all maps. This product is distributed "as is" without warranties of any kind, either expressed or implied. This map is intended for use only at the published scale.